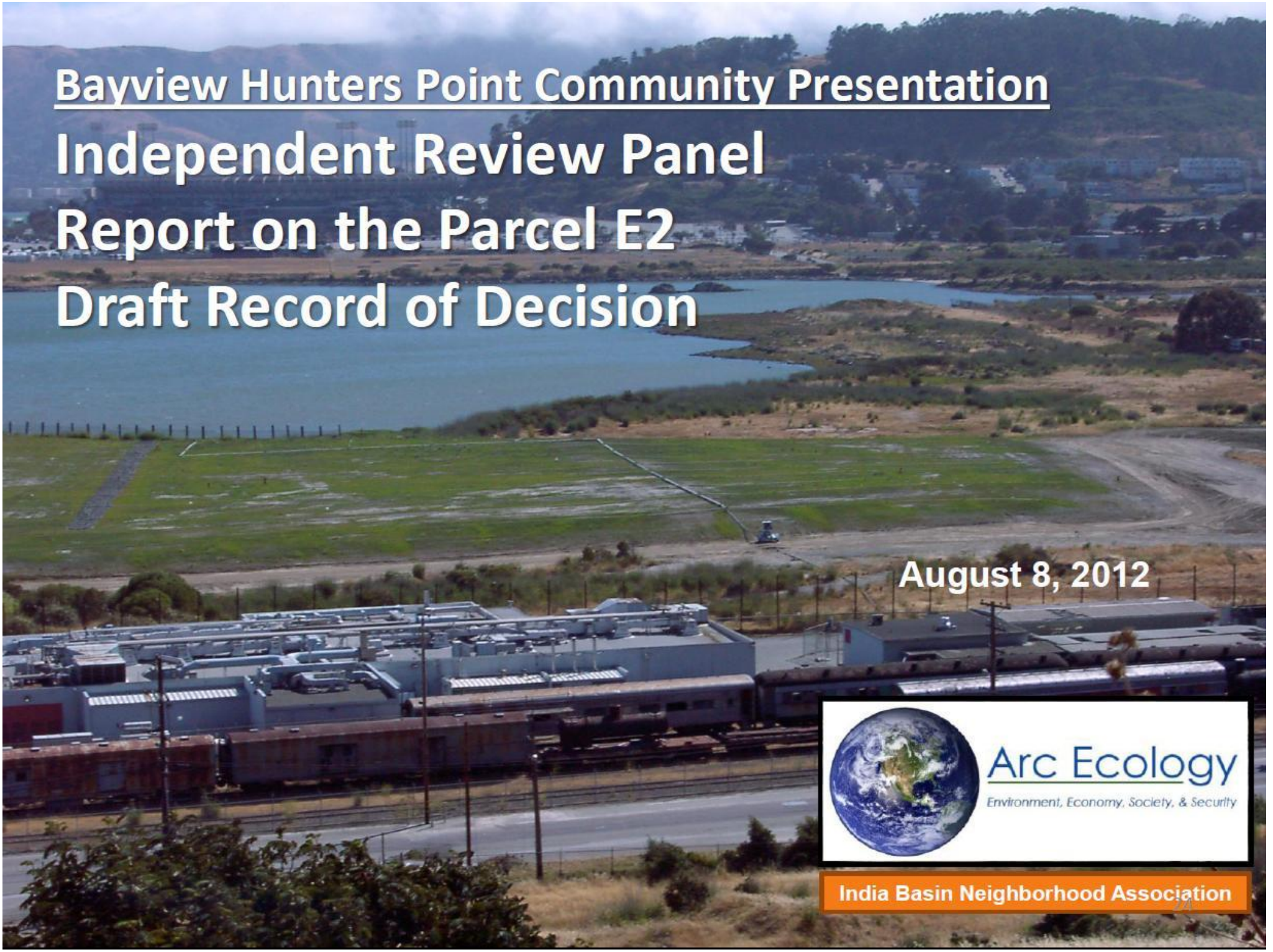
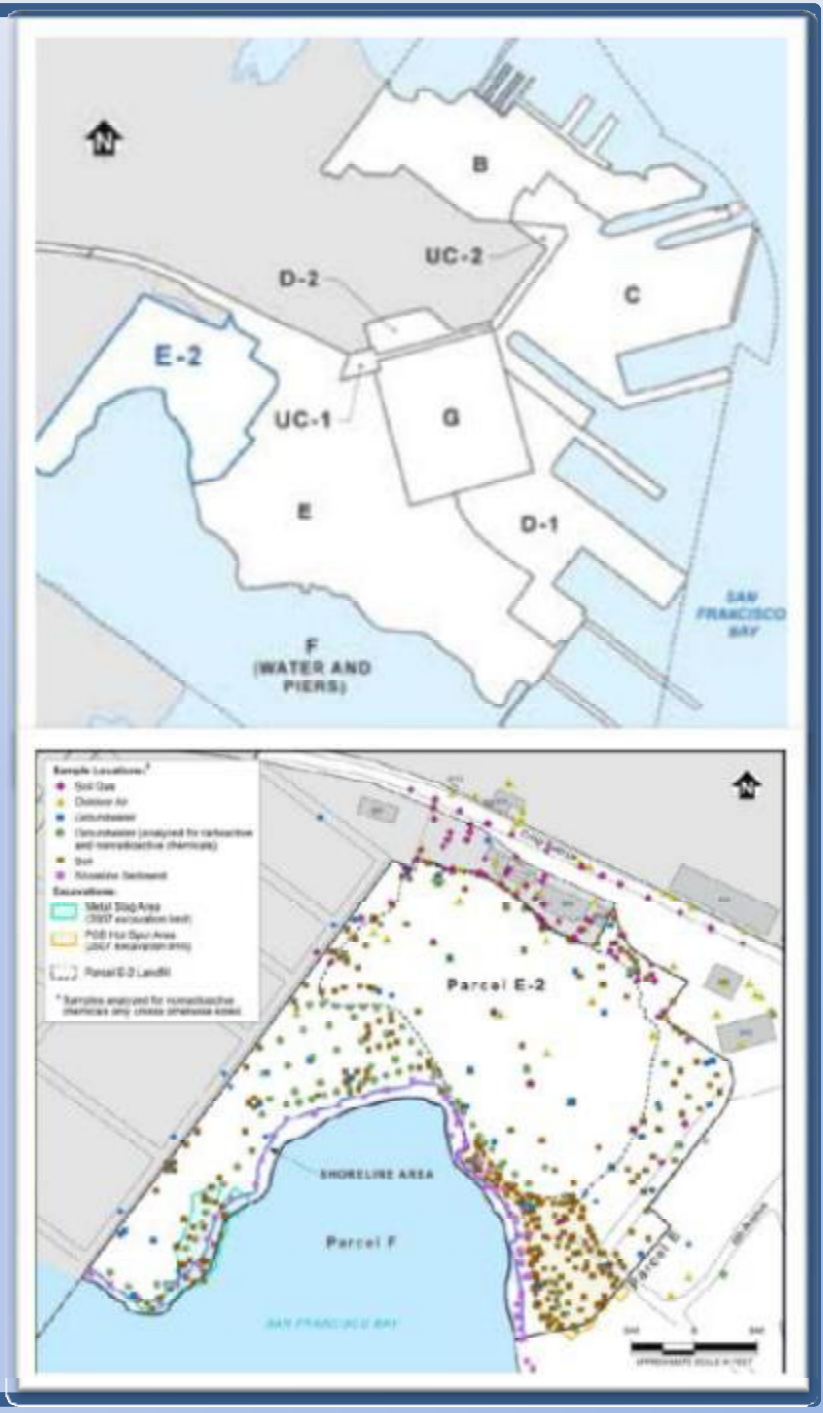

Bayview Hunters Point Community Presentation
Independent Review Panel
Report on the Parcel E2
Draft Record of Decision
August 8, 2012
Arc Ecology
Environment, Economy, Society, & Security
India Basin Neighborhood Association

AGENDA

- Welcome
- The Independent Review
- Response To July 10, 2012 Meeting Questions
- Findings
- Recommendations
- Draft Final E2 Record of Decision
- & Next Steps
- Adjournment
- Informal Questions and Answers with Review Panel



The Independent Review

- Is a U.S. Environmental Protection Agency Funded Assessment of the Technical Adequacy of the Navy's Draft Record of Decision for Hunters Point Shipyard Parcel E2

Please Note…

The Independent Review Panel and Arc Ecology are not governmental representatives!!

- **The Independent Review Panel and Arc Ecology HAVE NO power to make decisions, change polices, or require adjustments to Shipyard remedial plans.**

Who Has The Power?

- **Only the**
  - ➢ **NAVY,**
  - ➢ **US EPA, &**
  - ➢ **State Regulators**

  have the authority to make decisions, change polices, or require adjustments to Shipyard remedial plans!

Arc Ecology is a **Bayview Hunters Point** public interest **nonprofit**

- We have been working on Bayview Hunters Point environmental health & economic development issues for almost 30 years.
- We are the community technical advisor for the India Basin Neighborhood Association's US EPA Technical Assistance Grant for the Hunters Point Shipyard.

The Independent Review Panel

- Are three scientists expert in areas of geology, landfill engineering, toxicology, risk assessment, radiation, and industrial hygiene hired by Arc Ecology to conduct an Independent Review of the Navy's Draft Record of Decision – the remedial plan – for the Hunters Point Shipyard's E2 Parcel.

We are not governmental officials

The Independent Review IS:

- **An Assessment of the Technical Competency of the Parcel E2 Draft Record of Decision *Independent of the Influence of the*:**
  - **NAVY,**
  - **US EPA,**
  - **State Regulators,**
  - **City of San Francisco,**
  - **Property Developer,**
  - **The India Basin Neighborhood Association, *and***
  - **Arc Ecology**

Purpose of the Independent Review

- To determine whether the quality of the Navy's study of Parcel E2 was sufficient to make a recommendation
- To determine if the recommendation was protective of human health and the environment

Parameters of the Independent Review

- **What Arc Ecology could ask the reviewers to do:**
  - **Determine whether "State of the Practice" standards were used in crafting the ROD**
    - **Was sampling adequate?**
    - **Was the data available sufficient?**
    - **Were applicable technical regulations and guidance followed?**

Parameters of the Independent Review continued

- **Determine if the ROD recommendation was disproportionate with remedies at other similar sites in other communities:**
  - ***Given the current "State of the Practice" – did the Draft ROD subject BVHP to a greater risk - than other communities where the same remedy was implemented***

Parameters of the Independent Review continued

- ***Based on current "State of the Practice"***

  Determine if the proposed Draft ROD remedy was safe:

  - **seismically,**
  - **for workers,**
  - **for transport if required,**
  - ***and* the community.**

Parameters of the Independent Review continued

What this review <u>could</u> do:

- In response to *inadequacies in either documentation or remedial planning:*
  - Make technical recommendations for actions by the Navy, EPA, & State Regulators to correct irregularities or improve the response consistent with the *current State of the Practice*

Parameters of the Independent Review continued

What this review could not do:

- **NO INDEPENDENT SAMPLING**
  - Could not collect soil, water, or air samples and engage certified labs to independently verify the Navy's data

Parameters of the Independent Review continued

What this review could not do:

- **REVISE CURRENT APPROACHES TO HEALTH RISK ASSESSMENT**
  - **Had to follow standard approaches to assessing public health risks for Superfund Sites**

Parameters of the Independent Review continued

What this review could not do:

- **CREATE NEW SCIENCE**
  - Could not conduct independent studies to challenge existing accepted protocols
  - Could not evaluate whether the current "State of the Practice" is a valid methodology to follow

Parameters of the Independent Review continued

What this review could not do:

- **EXPAND THE BOUNDARIES OF THE REVIEW**
  - Could not conduct an independent assessment of the contribution of the Draft ROD's recommended remedy to the cumulative health risk created by the toxic burden carried by BVHP as a result of the aggregate exposure to numerous toxic sites on and off the Shipyard

Parameters of the Independent Review continued

What Arc Ecology did to implement the review:

- **Hired scientists (April/ May)**
  - **Identified the key areas of the Draft ROD needing consultative review:**
    - **Geologist, Landfill Expert – Mark Wheeler**
    - **Toxicologist, Health Risk Assessment – Greg Brorby**
    - **Health Physicist, Radiological Cleanup – Steve Bump**

Parameters of the Independent Review continued

What Arc Ecology did to implement the review:

DUE DILIGENCE

- **Conducted a thorough search:**
  - Sought recommendations.
  - Interviewed a number of possible contractors.
  - Checked the backgrounds of the candidates.
  - Conducted second level interviews including commitments to the ethics of the Independent Review

Parameters of the Independent Review continued

What the Technical Team did:

- **Reviewed Draft ROD and Associated Reports/ DATA**
  - **June & July**
  - **Site visit**
  - **Participated in July 10th community meeting**
  - **Considered community feedback during technical review**

Parameters of the Independent Review continued

What Arc Ecology did:

- **July 10th community meeting**
  - Introduced BVHP Community Leaders and residents to the Independent Review Team
  - Organized and promoted the Community Meeting on July 10th
  - Provided copies of resumes for Independent Review Team members
  - Presented USEPA Overview of the Draft ROD/ CERCLA process
  - Took commentary from a panel of community leaders
  - Took comment from community participants

MAJOR CONCERNS AND THEMES EXPRESSED DURING THE JULY 10th COMMUNITY MEETING

Major Community Concerns & Themes

1. LANDFILL CHARACTERIZATION

- Is it really municipal waste?
- Does it appear as though the Navy accurately captured the extent of the landfill?
- Did the Navy do a sufficient amount of sampling within the capped area of the landfill to have a good understanding of the contaminants in the site?
- Did the Navy adequately assess the effects of earthquake shaking and liquefaction?
- Did the Navy accurately assess the costs of each option in the proposed plan?
- Did the Navy adequately assess the impacts of sea level rise?

Major Community Concerns & Themes continued

2. LANDFILL CHARACTERIZATION: RADIOLOGICAL

- **Did the Navy really only sample the upper 6 inches of soil for radiological impact?**

Major Community Concerns & Themes continued

3. PUBLIC & ENVIRONMENTAL HEALTH & SAFETY

- **Does timing affect the dose response in an exposure?**
  - **Would that change the health risk assessment for this site?**
- **How serious is the hazard of exposure to workers and the public due to excavation?**
  - **What is the evidence supporting the contention?**
- **Is it possible to assess the contribution of the landfill on the cumulative effect of all of the pollution in the community?**

ANSWERS TO CONCERNS AND THEMES EXPRESSED DURING THE JULY 10th COMMUNITY MEETING

Responding

Mark C. Wheeler, P.G.

Principal – Crawford Consulting, Inc.

Mr. Wheeler has over 30 years of professional experience in hydrogeology, geology, geochemistry, and environmental science, including 26 years as an environmental consultant in California. He has been the project manager, technical program manager, or project geologist for over 75 sites involving subsurface characterization, geologic and hydrogeologic evaluation, water quality assessment, and remedial measures implementation.

Answers

1. LANDFILL CHARACTERIZATION

- **Is it really municipal waste?**
  - **Obviously not operated as a municipal landfill, but does it meet the definition of a municipal waste landfill per US EPA guidance for remedial actions at Superfund sites?**
  - **I compared the US EPA guidance for municipal waste landfills to what has been found in the Parcel E-2 Landfill**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Is it really municipal waste? continued**

US EPA definition of municipal solid waste includes:

- **garbage, refuse, other durable and non-durable goods**
- **may include household hazardous waste as well as hazardous wastes generated by small quantity generators**
- **waste from industrial, commercial, mining, agricultural, and community activities**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Is it really municipal waste? continued**

EPA Guidance for landfills to be considered as municipal landfills for purpose of remediation under Superfund:

- **Waste is a heterogeneous mixture of municipal waste frequently co-disposed with industrial and lesser quantities of hazardous waste**
- **May include military waste, including certain types of radioactive waste**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Is it really municipal waste? continued**
  - **Compiled and reviewed all the descriptions of the waste materials encountered at Parcel E-2, as recorded on the logs of borings and test pits**
    - **33 exploratory borings**
    - **22 test pits**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Is it really municipal waste? continued**

Descriptions support the statement by the Navy that the landfill waste consists primarily of:

wood, paper, plastic, metal, glass, nails, foam, copper wire, cloth, rubber, plywood, ceramics, asphalt, concrete, and bricks, which are mixed with sand, clay, and gravel fill

Answers continued

1. LANDFILL CHARACTERIZATION

- **Is it really municipal waste? continued**
  - **In addition to municipal-type wastes and construction debris, industrial and military wastes were also disposed of, including:**

    sandblast waste, radioluminescent devices, asbestos containing debris, paint sludge, solvents, and waste oils

Answers continued

1. LANDFILL CHARACTERIZATION

- **Is it really municipal waste? continued**

  Data indicate that the amount of industrial and hazardous waste is less than amount of municipal-type waste and construction debris

Answers continued

1. LANDFILL CHARACTERIZATION

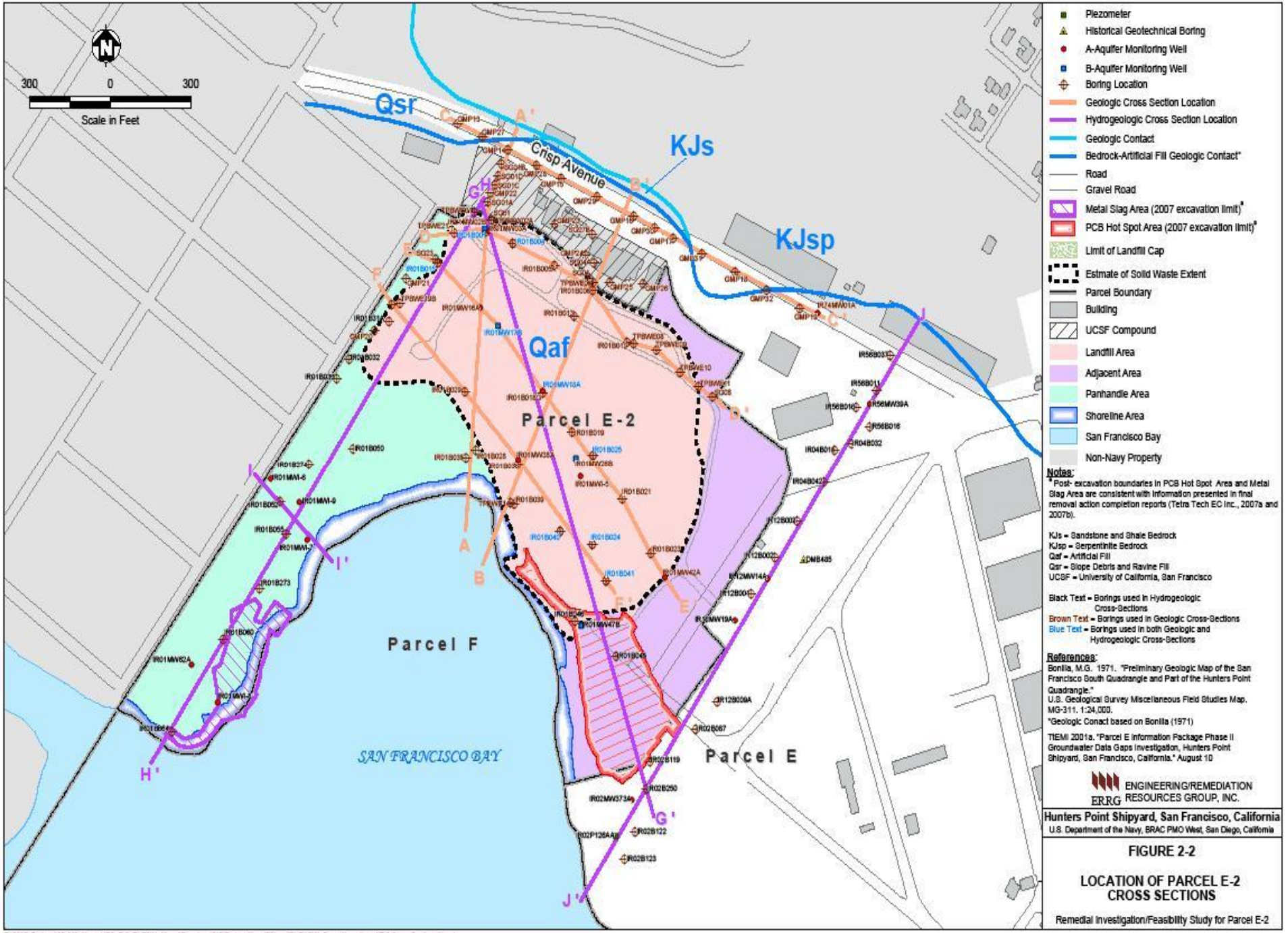
- **Is it really municipal waste? continued**

  Review of data supports determination of the Parcel E-2 landfill as a municipal landfill per US EPA guidance for remedial actions at Superfund sites

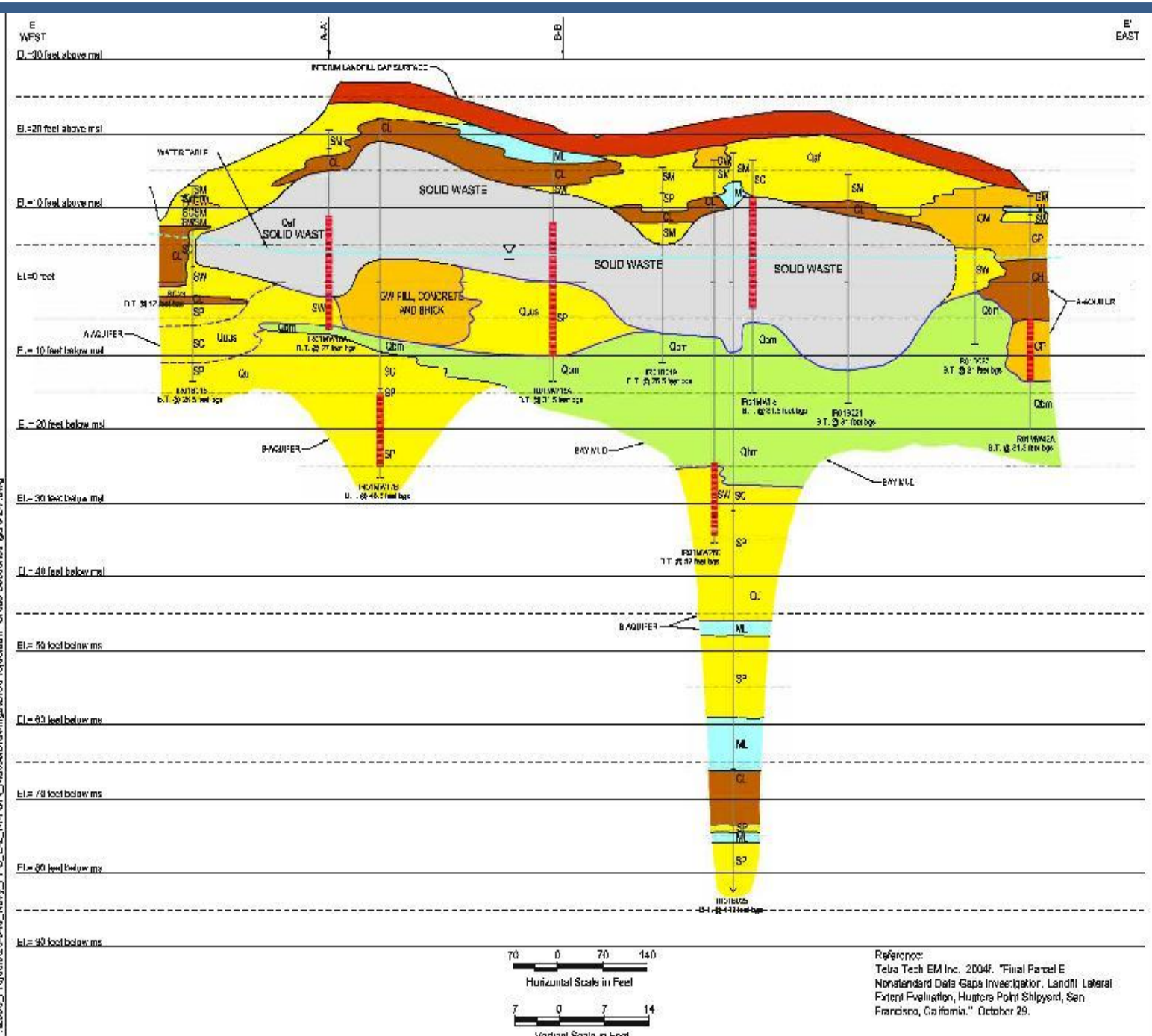
Answers continued

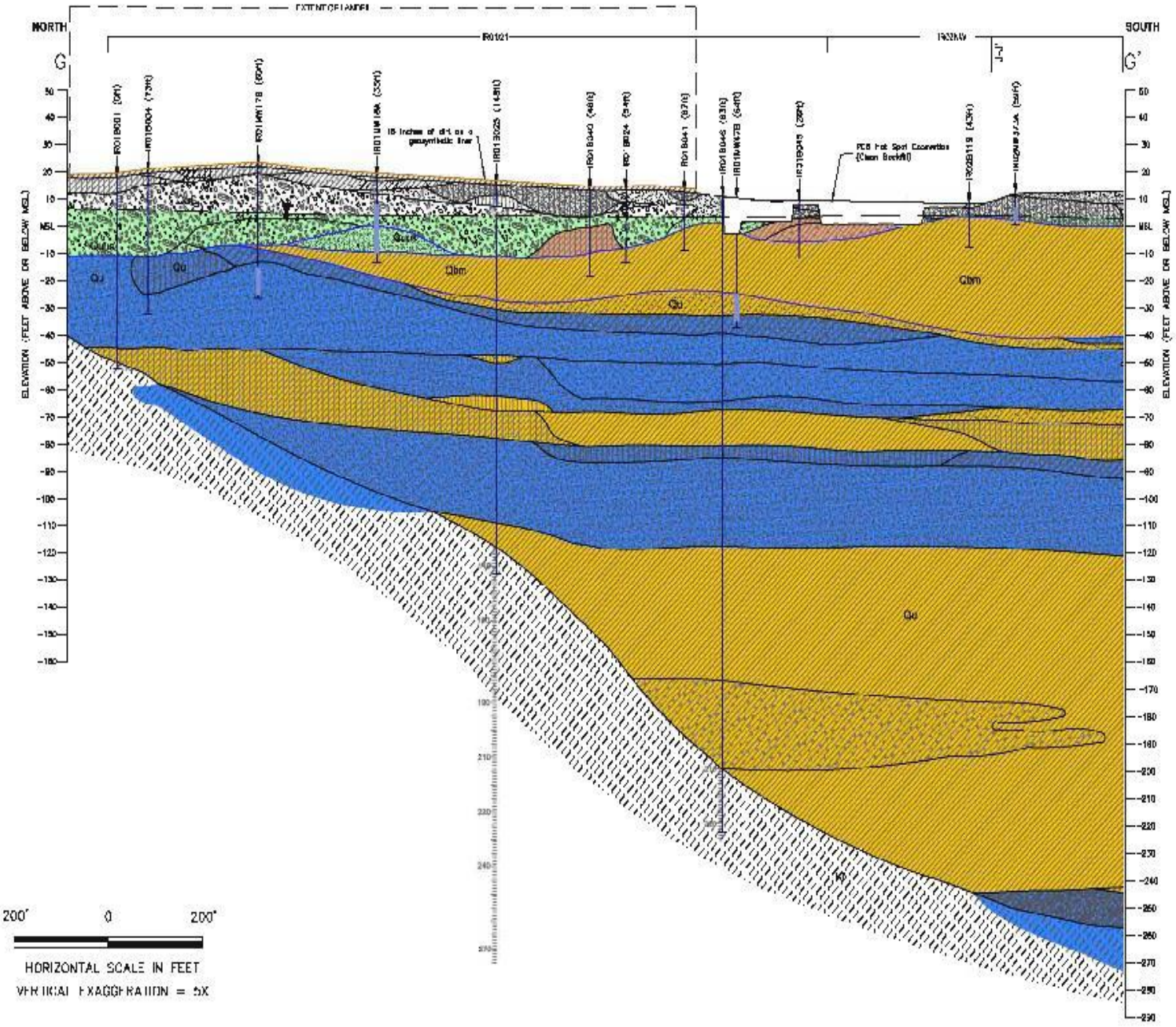
1. LANDFILL CHARACTERIZATION

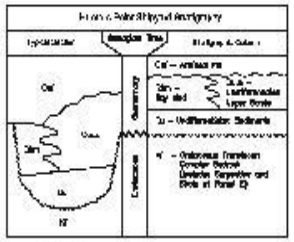
- **Does it appear as though the Navy accurately captured the extent of the landfill?**
  - **Data on the nature and extent of the waste materials in the landfill has been collected during numerous state-of-the practice site investigations and interim remedial actions**
  - **I reviewed the number and placement of the borings and test pits, the descriptions of the waste materials encountered, and the cross-sections that were constructed to show the position of the landfill materials and native soils**



P:\2005_Projects\25-049_Navy_HPS_E-2_RI-FSN_Maps&Drawings\GIS\Projects\Landfill\Landfill_RI\GW_figures\Location of E-2 Cross Sections1.mxd


E
WEST
E'
EAST
A-A'
B-B'
SOLID WASTE
Qaf
SOLID WAST
GW FILL, CONCRETE AND BRICK
Qaus
Qbm
Qu
Qsm
Qbr
BAY MUD
A-AQUIFER
B-AQUIFER
Water Table Measurement on February 20, 2002; Water Level Shown is A-aquifer (dashed where inferred)
Lithologic or Waste Boundary (dashed where inferred)
Formation Boundary (dashed where inferred)
Boring Location (tic marks represent change in lithology)
IR01BG08
IR01MW17B
Screened Area
Intersection Location of Cross Sections
Cap
Sand
Clay
Silt
Gravel
Bay Mud (clay)
Solid Waste
Notes:
bgs below ground surface
B.T. borehole termination
CH high-plasticity clay
CL clay
El. elevation
GM silty gravel
GP poorly graded gravel
GW well graded gravel
ML silt
msl mean sea level
Qaf Artificial Fill
Qbm Bay Mud (clay)
Qu Undifferentiated Sediments
Qaus Undifferentiated Upper Sand Deposits
SC clayey sand
SM silty sand
SP poorly graded sand
SW well graded sand
70 0 70 140
Horizontal Scale in Feet
7 0 7 14
Vertical Scale in Feet
Reference:
Tetra Tech EM Inc. 2004f. "Final Parcel E Nonstandard Data Gaps Investigation, Landfill Lateral Extent Evaluation, Hunters Point Shipyard, San Francisco, California." October 29.
ERRG Engineering/Remediation Resources Group, Inc.
Hunters Point Shipyard, San Francisco, California
U.S. Department of the Navy, BRAC PMO West, San Diego, California
FIGURE 2-7
CROSS SECTION E-E'
Remedial Investigation/Feasibility Study for Parcel E-2





Legend

- Formation Contact (dashed where inferred)
- Lithological Contact (dashed where inferred)
- Ground Surface
- Landfill Cap
- Mean Sea Level
- (Boreholes Projected to Cross Section)
- Monitoring Well/Soil Boring Location
- Well Screen
- A-Aquifer Zone Water Table February 2002
- IR Boundary
- Intersection location of cross sections
- A-Aquifer Zone
- B-Aquifer Zone
- Aquitard Zone
- Bedrock Low Permeable Zone based on Lithology

Gravel, Clayey Gravel, Silty Gravel, Sandy Gravel, Sand, Clayey Sand, Silty Sand, Gravelly Sand, Silt, Clayey Silt, Sandy Silt, Gravelly Silt, Clay, Silty Clay, Sandy Clay, Gravelly Clay, Sand/Gravel/Clay Mixture, Boulder Fill, Weathered Bedrock, Bedrock, Concrete, Debris

Notes:

1. These cross-sections represent one interpretation of the shallow subsurface along the corresponding line; alternate interpretations are possible.
2. Borings have been projected onto the lines of section. The projection of borings' lithologies may cause graphical distortions of geological features.
3. Bedrock and sediment contact is based on lithological logs and a bedrock surface map.

Reference:

Tetra Tech EM, Inc. 2004. Final Parcel C Groundwater Survey Report, Phase II Groundwater Data Gap Investigation, Hunters Point Shipyard, May

Engineering/Remediation Resources Group, Inc.

Hunters Point Shipyard, San Francisco, California

FIGURE 2-9

CROSS SECTION G-G'

Answers continued

1. **LANDFILL CHARACTERIZATION**
   - **Does it appear as though the Navy accurately captured the extent of the landfill?**
     - **Vertical and lateral extent of landfill defined**
     - **Subsurface stratigraphy and hydrogeologic units adequately characterized**
     - **Level of understanding and characterization consistent with state-of-the-practice investigations for landfills**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy do a sufficient amount of sampling within the capped area of the landfill to have a good understanding of the contaminants in the site?**
  - **Sample collection and analysis conducted of soil and groundwater consistent with state-of-practice and regulatory requirements for landfill characterization and monitoring programs**
  - **Chemical analyses performed for wide range of contaminants, soil and groundwater results give good idea of types of contaminants in landfill**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy do a sufficient amount of sampling within the capped area of the landfill to have a good understanding of the contaminants in the site?**
  - **Answer on "sufficient amount of sampling" depends on how using results**
  - **Not enough sampling to fully know all health risks that might be associated with excavating the landfill materials**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy do a sufficient amount of sampling within the capped area of the landfill to have a good understanding of the contaminants in the site?**
  - **Answer on "sufficient amount of sampling" depends on how using results**
  - **Sufficient sampling to support the selection of an overall remedial approach, with the understanding that more analyses would be needed for design of the proposed remedial alternative of capping and containment**

Answers continued

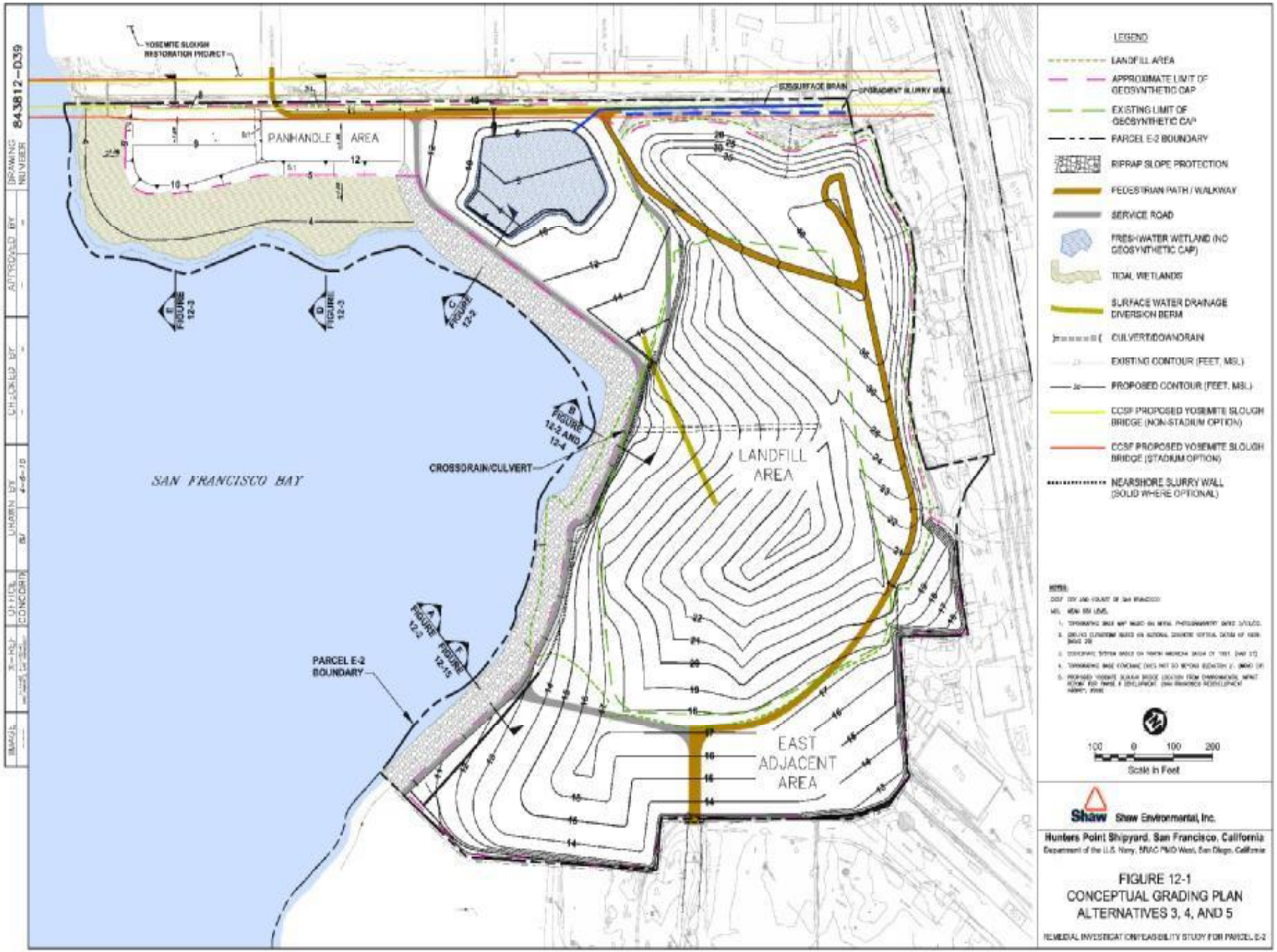
1. LANDFILL CHARACTERIZATION

- **Did the Navy adequately assess the impacts of sea level rise?**
  - **RI/FS reviewed sea-level rise estimates, including Intergovernmental Panel on Climate Change (IPCC)**
  - **Based on the IPCC estimates, the estimated maximum sea level rise by 2100 is 88 centimeters or 2.9 feet**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy adequately assess the impacts of sea level rise? continued**
  - **11 to 12 vertical feet of shoreline protection provided in the preliminary design (greater than 3 times expected rise in sea level)**
  - **Shoreline protection system will be further evaluated during final design relative to several factors including potential rise in sea level**


YOSEMITE SLOUGH RESTORATION PROJECT
SUBSURFACE DRAIN
CUTOFF SLURRY WALL
PANHANDLE AREA
SAN FRANCISCO BAY
CROSSDRAIN/CULVERT
LANDFILL AREA
EAST ADJACENT AREA
PARCEL E-2 BOUNDARY
LEGEND
LANDFILL AREA
APPROXIMATE LIMIT OF GEOSYNTHETIC CAP
EXISTING LIMIT OF GEOSYNTHETIC CAP
PARCEL E-2 BOUNDARY
RIPRAP SLOPE PROTECTION
PEDESTRIAN PATH / WALKWAY
SERVICE ROAD
FRESHWATER WETLAND (NO GEOSYNTHETIC CAP)
TIDAL WETLANDS
SURFACE WATER DRAINAGE DIVERSION BERM
CULVERT/DOWNDRAIN
EXISTING CONTOUR (FEET, MSL)
PROPOSED CONTOUR (FEET, MSL)
CCSF PROPOSED YOSEMITE SLOUGH BRIDGE (NON-STADIUM OPTION)
CCSF PROPOSED YOSEMITE SLOUGH BRIDGE (STADIUM OPTION)
NEARSHORE SLURRY WALL (SOLID WHERE OPTIONAL)
100 0 100 200
Scale in Feet
Shaw Environmental, Inc.
Hunters Point Shipyard, San Francisco, California
Department of the U.S. Navy, BRAC PMO West, San Diego, California
FIGURE 12-1
CONCEPTUAL GRADING PLAN
ALTERNATIVES 3, 4, AND 5
REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR PARCEL E-2

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy adequately assess the effects of earthquake shaking and liquefaction?**
  - **Studies conducted for the Navy characterized the amount of shaking and liquefaction expected**
  - **For study, evaluated shaking expected for Maximum Probable Earthquake, in this case same as Maximum Credible Earthquake, the 1906 San Francisco Earthquake, M 7.9**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy adequately assess the effects of earthquake shaking and liquefaction?**
  - **Lateral movement of soil below the waste caused by liquefaction may be on the order of 4 to 5 feet**
  - **Settlement of soil below the waste may approach 10 inches**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy adequately assess the effects of earthquake shaking and liquefaction? continued**
  - **Engineering solutions employed for preliminary landfill cover design - Geogrid liner in landfill toe berm**
  - **Capable of mitigating hazards due to liquefaction and lateral spreading**

Answers continued

1. LANDFILL CHARACTERIZATION

- **Did the Navy adequately assess the effects of earthquake shaking and liquefaction? continued**
  - **Stability of the landfill materials during earthquake shaking was not specifically evaluated in the Draft ROD and RI/FS, just stability of underlying soils was analyzed for seismic response**
  - **This analysis of seismic behavior of landfill materials together with underlying soils will need to be included in final design process**

Answers continued

COST

- ***Did the Navy accurately assess the costs of each option in the proposed plan?***
  - **Navy followed US EPA Guidance on Developing Cost Estimates for each option**

    Capital costs, annual O&M costs

    Contingency allowances, to cover unknowns or unanticipated conditions, assigned 20 % contingency

Answers continued

COST

- ***Did the Navy accurately assess the costs of each option in the proposed plan?*** **continued**
  - **For cost estimating purposes, used a standard 30-year postclosure monitoring period**
  - **Expected postclosure monitoring period actually much longer – as long as site presents a potential threat to the environment**

Answers continued

COST

- ***Did the Navy accurately assess the costs of each option in the proposed plan?*** **continued**
  - **Alternative 2 – Excavation and Off-Site Disposal**

    Total volume excavated from landfill area = ~1 Million cubic yards (cover soils, landfill, contaminated soils)

    4-year construction period

    Total cost = $367 Million

Answers continued

COST

***Did the Navy accurately assess the costs of each option in the proposed plan?* continued**

- **Alternative 5 – Landfill Capping and Containment, Hot-Spot Excavation**

  Total volume of material excavated for off-site disposal = ~75,000 cy

  2-year construction period
  Total cost = $96.9 Million

Answers continued

COST

- ***Did the Navy accurately assess the costs of each option in the proposed plan?***
  continued
  - **General assumptions reasonable**
  - **Industry standard guidelines and costs**

Answers continued

COST

- ***Did the Navy accurately assess the costs of each option in the proposed plan?***
  continued
  - **More unknowns and uncertainties for the waste excavation alternative that could affect the costs than for the capping and containment alternative**
  - **Believe well within EPA guidance which prescribes an accuracy of +50 / -30 percent**

Responding

Stephen L. Bump, CHP, CIH, PMP
Deputy Chief Operating Officer
- Dade Moeller

Mr. Bump has more than 34 years of nuclear facility experience, with more than 20 years as a manager and supervisor. His health and safety experience includes burial site operation and oversight, decontamination and decommissioning (D&D), environmental restoration, reactor operations, regulatory compliance and oversight, dosimetry, program management, program development, waste characterization and shipping, instrumentation, risk assessment, emergency response and emergency plan development, health and safety assessments, and Environment, Safety and Health management at hazardous waste sites. He has developed Health and Safety Plans in accordance with Occupational Safety and Health Administration requirements for hazardous waste operations

Answers continued

2. LANDFILL CHARACTERIZATION: RADIOLOGICAL

- **Did the Navy really only sample the upper 6 inches of soil for radiological impact?**

  - Yes: As noted in Section 2.3, over 1000 points were sampled in 2002 and 2003 as part of the Phase V Investigative Study. These were samples to six inch depth.
  - This was completed over the entire surface of Parcel E2
  - For the Interim Cap, this had the effect of only sampling the soil imported in 2001.

Responding

Gregory P. Brorby

Senior Managing Scientist

ToxStrategies, Inc.

Mr. Gregory P. Brorby is a a board-certified toxicologist with more than 25 years of experience in the fields of human health risk assessment, exposure simulation and dose reconstruction, and toxicology. Mr. Brorby has evaluated potential human health risks according to risk assessment methodologies prescribed in CERCLA, RCRA, and other guidance specified by state or federal agencies. These evaluations have involved a wide variety of chemicals and exposure scenarios.

Answers continued

3. PUBLIC & ENVIRONMENTAL HEALTH & SAFETY

- **Does timing affect the dose response in an exposure?**
- **Would that change the health risk assessment for this site?**
  - **Long- known that timing of exposure can affect toxicity**
    - **Discovery in early 1960s that thalidomide exposure during early pregnancy can result in absent or abnormal limb development**

Answers continued

3. PUBLIC & ENVIRONMENTAL HEALTH & SAFETY

- **Does timing affect the dose response in an exposure?**
- **Would that change the health risk assessment for this site? continued**
  - **More recent research suggests early-life susceptibility to some carcinogens or endocrine disruptors**
  - **Timing of exposure is accounted for in some toxicity criteria**
    - **e.g., methyl mercury; vinyl chloride**

Answers continued

3. PUBLIC & ENVIRONMENTAL HEALTH & SAFETY

- **How serious is the hazard of exposure to workers and the public due to excavation?**
- **What is the evidence supporting the contention?**
  - **Excavation of the landfill will require uncovering, removing, and disposing of the waste material over an estimated 4-year period**
  - **Dust control and other measures can reduce, but not eliminate, potential exposure to surrounding community**

Answers continued

3. PUBLIC & ENVIRONMENTAL HEALTH & SAFETY

- How serious is the hazard of exposure to workers and the public due to excavation?
- What is the evidence supporting the contention? continued
  - Potential risks during excavation are uncertain due to uncertainty of waste types in landfill
    - Additional data may be necessary to better evaluate potential risks associated with excavation

Answers continued

3. PUBLIC & ENVIRONMENTAL HEALTH & SAFETY

- **Is it possible to assess the contribution of the landfill on the cumulative effect of all of the pollution in the community?**
  - **"Cumulative" risk assessment is in its infancy**
    - **Efforts underway on state and national levels to develop methods to include effects of non-chemical stressors**
  - **State-of-the-practice risk assessment for Superfund sites is limited to assessing risk from site alone**

FINDINGS

Reports of Independent Review Panel Members

Independent Review of Landfill Remedy Proposed In Parcel E2 Draft ROD

Mark C. Wheeler, P.G.

Principal – Crawford Consulting, Inc.

Mr. Wheeler has over 30 years of professional experience in hydrogeology, geology, geochemistry, and environmental science, including 26 years as an environmental consultant in California. He has been the project manager, technical program manager, or project geologist for over 75 sites involving subsurface characterization, geologic and hydrogeologic evaluation, water quality assessment, and remedial measures implementation.

FINDINGS: Wheeler

Parcel E-2 Landfill Comparison

Parcel E-2 landfill is similar to a number of other bay margin waste disposal sites in the San Francisco Bay Area

- Wastes originally placed directly on tidal marshlands – common practice at the time
- At these sites now, significant portions of the waste fill now below the elevation of shallow groundwater


West Contra Costa Class I Hazardous Waste Management Facility - Richmond
City of Berkeley Landfill
Parcel E-2
City of Alameda Landfill
Sierra Point Landfill - Brisbane
Oyster Point Landfill - South San Francisco
West Winton Landfill - Hayward
Westport Landfill - Redwood City
City of Palo Alto Landfill
City of Mountain View Landfill
Highway 237 Landfill - Alviso
160
4
242
580
950
13
80
238
101
35
280
92
880
84
650
37

FINDINGS: Wheeler continued

Parcel E-2 Landfill Comparison continued

- **At all these landfills:**
  - **capping and containment strategies employed**
  - **landfills capped with an engineered cover**
  - **groundwater monitoring and control**
  - **institutional controls**

FINDINGS: Wheeler continued

Draft ROD – Navy's Proposed Remedy

- **Follows USEPA directive "Presumptive Remedy for CERCLA Municipal Landfill Sites, "**
- **Establishes containment as the presumptive remedy for Superfund municipal landfills**

FINDINGS: Wheeler continued

Draft ROD
– Navy's Proposed Remedy continued

- **USEPA directive, "Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills," clarifies when the application of the containment presumptive remedy is appropriate for landfills found at military installations**
  - **Excavation not generally considered for sites with more than 100,000 cubic yards of waste**
  - **Parcel E-2 Landfill = 473,000 cubic yards waste in place**

FINDINGS: Wheeler continued

Draft ROD – Navy's Proposed Remedy continued

- **Capping and containment is the most widely used and accepted practice for landfills of the size and general composition of the Parcel E-2 landfill**
- **The remedial approach selected in the RI/FS and draft ROD is consistent with remedial approaches for similar sites**

FINDINGS: Wheeler continued

Draft ROD – Navy's Proposed Remedy

Based on my review of data and findings,

- **Selection of capping and containment as the remedial measure for the Parcel E-2 Landfill is consistent with the USEPA guidance and Presumptive Remedy Approach**

FINDINGS: Wheeler continued

Draft ROD – Navy's Proposed Remedy continued

- **The selected remedial approach should be capable of providing levels of protection for human health and the environment that meet or exceed regulatory standards**

FINDINGS: Wheeler continued

Draft ROD – Navy's Proposed Remedy

- **While the investigations and remedial actions to date have provided sufficient information to choose the overall remedial approach, and prepare preliminary designs for the capping and containment systems, *my review has identified some deficiencies in the evaluations and preliminary designs completed to date***

FINDINGS: Wheeler continued

Draft ROD
– Navy's Proposed Remedy Deficiencies continued

- **Stability of the landfill materials during earthquake shaking was not specifically evaluated in the Draft ROD and RI/FS, just stability of underlying soils was analyzed for seismic response**
- **This analysis of seismic behavior of landfill materials together with underlying soils will need to be included in final design process**

FINDINGS: Wheeler continued

Draft ROD
– Navy's Proposed Remedy Deficiencies

If the proposed remedial approach is chosen in the Final Record Of Decision,

- **project would enter a final design stage,**
- **with additional studies to fill in data gaps, and**
- **provide supplement studies needed in order to design the final remedial measures**

FINDINGS: Wheeler continued

Draft ROD
– Navy's Proposed Remedy Deficiencies

- **Deficiencies identified should be addressed during the final design process.**
- **Recommend third-party review during the final design process in order to provide the community with assurances that the technical issues are being appropriately addressed,**
- **and that safeguards to protect public health and the environment are being appropriately implemented**

Independent Review of Radiological Remedy Proposed In Parcel E2 Draft ROD

Stephen L. Bump, CHP, CIH, PMP
Deputy Chief Operating Officer
- Dade Moeller

Mr. Bump has more than 34 years of nuclear facility experience, with more than 20 years as a manager and supervisor. His health and safety experience includes burial site operation and oversight, decontamination and decommissioning (D&D), environmental restoration, reactor operations, regulatory compliance and oversight, dosimetry, program management, program development, waste characterization and shipping, instrumentation, risk assessment, emergency response and emergency plan development, health and safety assessments, and Environment, Safety and Health management at hazardous waste sites. He has developed Health and Safety Plans in accordance with Occupational Safety and Health Administration requirements for hazardous waste operations

FINDINGS: Bump

Presumptive Remedy

- **The EPA Guidance on municipal type waste landfills does include radioactive waste, particularly at military sites**

FINDINGS: Bump continued

Landfill Characterization

- **Surface Characterization is extensive**
  - **Cap is constructed from imported fill**
    - **Contains Radium-226, Cesium-137, Strontium-90**
    - **Ra-226 detected above remediation goal in essentially every location, Cs-137 detected at 46 locations across the entire parcel**
    - **Ra-226 is naturally occurring and is common. Cs-137 comes from fallout and is very close to the remediation goal, but the extent is a bit unusual**

FINDINGS: Bump continued

Landfill Characterization continued

- The proposed remedy is remove the top foot of the cap, perform a comprehensive survey and remove any material and anomalies exceeding remedial action goals.
  - Based on extent and actual levels of Ra-226 contamination that exist, it is likely the entire cap will need to be removed in accordance with the Navy's proposed remedy.
- Landfill surface will need to be resurveyed and anomalies that exceed action levels removed
- Note: The Navy is using a remedial action goal for Radium that is 5 times lower than the published EPA benchmark goal.

FINDINGS: Bump continued

Landfill Characterization continued

- No radiological sampling was done at depth
- Historical records were used in accordance with EPA guidance
- Early removal actions for chemical contaminants have not uncovered any unexpected radiological hazards

FINDINGS: Bump continued

Landfill Characterization continued

- Expected radiological items in landfill include:
  - Ships articles containing radium and strontium, such as deck markers, clocks, instruments, gauges
  - Industrial debris such as firebrick
  - Laboratory waste such as gloves, paper, glassware
  - Sandblast waste, but not from Operation Crossroads

Radiological Risk

- Radiological Risk is based on exposure to the radioactive material
- Unlike chemical exposure, you do not need direct contact with the material
- Radiation from the material can also give exposure to a person

Radiological Risk (Cont'd)

- The proposed remedy removes the radioactive material – prevents direct contact
- The proposed remedy caps any remaining material near the ground surface – provides shielding to prevent exposure from the radiation

Radiological Risk (Cont'd)

- Radiological Exposure in Perspective (in millirem)
  - Medical 300
  - Internal from Radon 228
  - External from Space 33
  - Internal from Ingestion 29
  - External from Terrestrial 21
  - Consumer Products 13
  - Industrial, Security, Research 0.3
  - Surface of E2 Landfill 0.001

Risk Summary

- The proposed remedy minimizes risk to the public
- What about other options?

Risk of Landfill Removal

- Risk to the workers
  - Based on expected radiological material – excavating and handling this material would be considered low hazard radiological work
  - Dealing with wet radioactive material does not create any more hazard that dealing with wet chemical material.

Risk of Landfill Removal (Con

- Risk to the Public
  - Risk of dust control during excavation
    - Need engineering controls: sprays, tents
  - Risk during transportation
    - Need transfer stations (Hanford experience)
    - Ship by rail (Preferred method)
  - Can be done safely

Conclusion

The Draft Record of Decision's proposed remedy is adequate to protect public health and safety from a radiological standpoint. Public involvement in the final design is critical.

Independent Review of Risk Assessments Conducted for Parcel E2 Draft ROD

Gregory P. Brorby DABT
Senior Managing Scientist
ToxStrategies, Inc.

Mr. Gregory P. Brorby is a a board-certified toxicologist with more than 25 years of experience in the fields of human health risk assessment, exposure simulation and dose reconstruction, and toxicology. Mr. Brorby has evaluated potential human health risks according to risk assessment methodologies prescribed in CERCLA, RCRA, and other guidance specified by state or federal agencies. These evaluations have involved a wide variety of chemicals and exposure scenarios.

FINDINGS: Brorby

Risk Assessment in Superfund Process

- **Remedial Investigation: Under current (i.e., "baseline") conditions, is remedial action warranted to protect human health and the environment?**
- **Feasibility Study: Is the remedial alternative protective of human health and the environment over the short-term (during implementation) and the long-term (after implementation)?**

FINDINGS: Brorby continued

Risk Assessment Overview

Risk = Exposure × Toxicity

or

Risk = Chemical Concentration × Exposure Factors × Toxicity

FINDINGS: Brorby continued

Baseline HHRA for Parcel E2

- Future use of site is recreational open space
- Future recreational users assumed to have contact with surface soil (0-2 feet)
- Future construction workers assumed to have contact with surface/subsurface soil
  (0-10 feet) and groundwater in trench (A aquifer)
- Future (nearby) residents assumed to have exposure to groundwater via domestic use
  (A and B aquifer or B aquifer)

FINDINGS: Brorby continued

Chemical Concentrations

- Soil
  - Calculated separately for half acre areas across Parcel E2
  - In many cases, maximum concentration used
- Groundwater
  - Calculated separately for A aquifer, A + B aquifer, and B aquifer

FINDINGS: Brorby continued

Exposure Factors

- Recreational User
  - General: 2.5 hours per day, 250 days per year for 30 years (birth to 30 years old)
  - Other: Default regulatory assumptions for residential scenario except soil ingestion rate (~1/5th of default)
    - For example, dermal contact with soil assumes person wearing short-sleeve shirt, shorts, and shoes

FINDINGS: Brorby continued

Exposure Assumptions continued

- Future Construction Worker
  - General: 8 hours per day, 250 days per year for 1 year
  - Other: Default regulatory assumptions for construction worker scenario
    - Some are the same as residential assumptions (e.g., exposed skin surface area); others higher than residential (soil ingestion rate, adherence of soil to skin)
    - No default for dermal contact with groundwater in a trench – assumed area equivalent to lower legs

FINDINGS: Brorby continued

Toxicity

- Toxicity criteria developed by regulatory agencies
  - Separate criteria for cancer and non-cancer endpoints
  - Primarily based on high-dose studies in animals and extrapolation to low doses
  - Current EPA guidelines require assessment of early life susceptibility for mutagenic chemicals
- Excess cancer risk of 1 in 1 million and noncancer hazard index of 1 used as points of departure

FINDINGS: Brorby continued

Results

- Soil – Future recreational user and construction worker
  - Excess cancer risk greater than 1 in 1 million or hazard index greater than 1 in many half acre areas
    - Risk much greater than 1 in 1 million or hazard index much greater than 1 in some areas
- Remedial action required for soil

FINDINGS: Brorby continued

Results continued

- Groundwater – Future construction worker
  - Excess cancer risk much greater than 1 in 1 million or hazard index greater than 1
- Groundwater – Future (nearby) residents
  - Excess cancer risk much greater than 1 in 1 million or hazard index much greater than 1
- Remedial action required for groundwater

FINDINGS: Brorby continued

Landfill Gas

- Separate evaluations
  - Hypothetical residents along Crisp Avenue
  - Workers on UCSF property
- Intrusion of vapors into indoor air (building must be directly on top of subsurface source)
  - 3-tier evaluation according to EPA guidance
- Estimated excess cancer risks less than 1 in 1 million and hazard index less than 1
  - Proposed remedy includes landfill gas extraction and monitoring system

FINDINGS: Brorby continued

Assessment of Remedial Alternatives for Parcel E2

- Includes evaluation of short-term effectiveness and long-term effectiveness (and permanence)
- Assessments are qualitative in nature
- Navy concludes
  - Alternative 2 has lower short-term effectiveness as compared to Alternatives 3 through 5
  - Alternative 2 has higher long-term effectiveness (and permanence) as compared to Alternatives 3 through 5

FINDINGS: Brorby continued

Comments to Baseline HHRA

- Generally conducted according to the current state-of-the-practice
  - Accounts for exposure to multiple chemicals
    - Assumes effects are additive; does not account for possible synergistic or antagonistic effects
  - For pathways evaluated, relied on conservative exposure factors (relatively little variation in population for most factors)
  - Does not account for genetic susceptibility or cumulative exposure to non-chemical stressors

FINDINGS: Brorby continued

Comments to Baseline HHRA continued

- Assuming future use as recreational open space, evaluated appropriate exposure scenarios and pathways, except:
  - The groundwater to fish ingestion pathway should have been included or its exclusion better justified
- Early life susceptibility for mutagenic compounds should have been included or exclusion justified
- Action level for non-methane organics (NMOC)s in landfill gas not sufficiently justified

FINDINGS: Brorby continued

Comments to Assessment of Remedial Alternatives

- **Insufficient information provided to evaluate the short-term effectiveness, especially for Alternative 2**
  - **Uncertainty in the waste types that could be encountered during excavation**
  - **Uncontrolled release of pressurized gas during installation of sheet pile wall**

FINDINGS: Brorby continued

Comments to Assessment of Remedial Alternatives continued

- **After implementation, potential health risks associated with Alternatives 3, 4, or 5 are essentially the same as for Alternative 2 IF engineering controls can be maintained over the long-term**
  - **Landfill waste is covered by cap**
  - **Contaminated soil is removed or covered by cap**
  - **Landfill gas in collected and treated**
  - **Institutional controls prevent domestic use of groundwater and other land uses**

Recommendations

Recommendations

- Navy should address overall stability of the landfill and proposed containment systems as required by CCR Title 27 for Class III landfills
  - Engineering properties of waste materials
  - Stability and potential displacement or settlement of waste materials during earthquake shaking
  - Combined effects of potential movement in waste materials and sediment beneath waste materials during earthquake shaking
  - Stability of landfill and existing and proposed containment systems under static and dynamic conditions

Recommendations (cont.)

- Navy should provide summary of performance to date of existing geocomposite landfill cap with respect to burrowing animals
- Navy should incorporate results of above assessments into planned additional studies of cover design, other containment features, and long-term monitoring and maintenance programs.

Recommendations (cont.)

- The Navy should immediately investigate if radium is detected in groundwater above background levels, because radium is highly mobile in salt water
- The Navy should re-evaluate or better substantiate the Non Methane Organic Compound (NMOC) action level in landfill gas

Next Steps

Next Steps

Independent Review Panel

Submits comments on August 10 to IBNA > EPA > Navy

Finalize and distribute summary of comments to community. Make full comments and Presentation available

Next Steps

Draft Final ROD

Released around September 10, 2012

- 30 Day Public Comment Period

Next Steps

Draft Remedial Design/ Remedial Action Plan

Around May 2013